

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-253418
(43)Date of publication of application : 05.10.1993

(51)Int.Cl. B01D 39/20

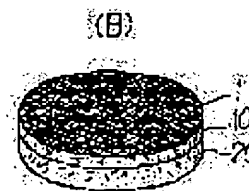
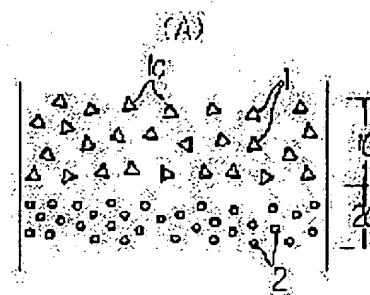
(21)Application number : 03-142651 (71)Applicant : TOKYO SEIKO CO LTD
(22)Date of filing : 20.05.1991 (72)Inventor : TARUMI SHINGO

(54) SINTERED TYPE FILTER

(57)Abstract:

PURPOSE: To provide a sintered type filter enhanced in capture efficiency of a foreign matter and filtration accuracy and remarkably improved in filterability and reliability by effectively combining the filterability of a linear metallic fiber with the filterability of a curved fine metallic fiber.

CONSTITUTION: This filter is provided with the 1st filtration fiber layer 10 made by laminating and sintering the linear metallic fiber 1 formed into polygonal shape in cross section by machining or cutting method or the like and the 2nd filtration fiber layer 20 made by laminating and sintering the curved fine metallic fiber 2 formed into circular like shape in cross section by bundling and drawing system or the like and by superposing on the 1st filtration fiber layer 10. And an intermediate filtration fiber layer made by laminating and sintering a linear metallic fiber having fine diameter and formed into polygonal shape in cross section by machining or cutting method or the like and by superposing between the 1st filtration fiber layer 10 and the 2nd filtration fiber layer 20 is provided.



LEGAL STATUS

[Date of request for examination] 14.03.1997
[Date of sending the examiner's decision of] 04.01.2000

PAT-NO: JP405253418A

DOCUMENT-IDENTIFIER: JP 05253418 A

TITLE: SINTERED TYPE FILTER

PUBN-DATE: October 5, 1993

INVENTOR-INFORMATION:

NAME

TARUMI, SHINGO

ASSIGNEE-INFORMATION:

NAME

COUNTRY

TOKYO SEIKO CO LTD

N/A

APPL-NO: JP03142651

APPL-DATE: May 20, 1991

INT-CL (IPC): B01D039/20

ABSTRACT:

PURPOSE: To provide a sintered type filter enhanced in capture efficiency of a foreign matter and filtration accuracy and remarkably improved in filterability and reliability by effectively combining the filterability of a linear metallic fiber with the filterability of a curved fine metallic fiber.

CONSTITUTION: This filter is provided with the 1st filtration fiber layer 10 made by laminating and sintering the linear metallic fiber 1 formed into polygonal shape in cross section by machining or cutting method or the like and the 2nd filtration fiber layer 20 made by laminating and sintering the curved fine metallic fiber 2 formed into circular like shape in cross section by bundling and drawing system or the like and by superposing on the 1st filtration fiber layer 10. And an intermediate filtration fiber layer made by laminating and sintering a linear metallic fiber having fine diameter and formed into polygonal shape in cross section by machining or cutting method or the like and by superposing between the 1st filtration fiber layer 10 and the 2nd filtration fiber layer 20 is provided.

COPYRIGHT: (C)1993,JPO&Japio

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The sintering mold filter characterized by to provide the 1st filtration fiber layer which carries out the laminating of the straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, and comes to sinter it, and the 2nd filtration fiber layer by which carried out the laminating of the detailed metal fiber of the shape of a curve formed in the cross-section approximate circle configuration, sintered it by the focusing wire-drawing method etc., and multistory was carried out to said 1st filtration fiber layer.

[Claim 2] The sintering mold filter characterized by providing the middle filtration fiber layer by which carried out the laminating of the narrow diameter straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, sintered it in the sintering mold filter according to claim 1, and multistory was carried out between said 1st filtration fiber layer and said 2nd filtration fiber layer.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is applied to the production process of chemicals, such as a synthetic-resin film and a synthetic fiber, etc., and relates to the sintering mold filter which demonstrates a highly precise filtration property under an elevated temperature, high pressure, and hyperviscous conditions.

[0002]

[Description of the Prior Art] The sintering mold filter which sintered metaled powder and fiber as a base material is developed. Especially the sintering mold filter that sintered the metal fiber as a base material Intermediary **** with the common sintering mold filter which carried out the laminating, sintered and was formed the detailed metal fiber of the shape of a curve which the adjustment of the amount of fiber and voidage by which a laminating is carried out is easy, and there is an advantage which can respond to a desired specification, and was formed by the focusing wire drawing method etc. in the diameter of fiber, and predetermined area at the cross-section approximate circle configuration b is formed. this sintering mold filter is shown in drawing 4 A -- as -- the detailed curve-like metal fiber 2 -- a filter hole -- in the use under high pressure Without passing without catching a filtered object, becoming [deforming easily with rigid lack, being easy to produce an opening,] the cause of the rate fall of prehension and subdividing large particles, such as resin A mesh is then expanded and passed through and the filtration accuracy can seldom expect that it is easy to be filtered at last [substantial] it restores to the original form after passage etc.

[0003] Moreover, the sintering mold filter which carried out the laminating of the straight-line-like metal fiber formed in the shape of a cross-section polygon, and sintered it by cutting or the decision method is developed, and it is proposed. it is shown in drawing 4 B -- as -- the straight-line-like metal fiber 1 -- a filter hole, although the fiber has a keen ridgeline by the shape of a cross-section polygon, and therefore raises the prehension effectiveness of a foreign matter to the decision function of the filtered object by the ridgeline and its filtration accuracy is improving, while forming a and preventing an opening This straight-line-like metal fiber has a large diameter of fiber compared with the detailed metal fiber of the shape of said curve, and there is a limitation in improvement in a filtration accuracy.

[0004]

[Problem(s) to be Solved by the Invention] the structure which the conventional above-mentioned sintering mold filter used said straight-line-like metal fiber as the base material, or sintered the detailed metal fiber of the shape of said curve as a base material -- in all, there is [intermediary ****] a limitation in improvement in the filtration accuracy and dependability naturally, and the cure against an improvement is demanded.

[0005] The place which this invention was developed in view of the above actual condition, and is made into ***** and its purpose raises the prehension effectiveness of a foreign matter, and a filtration accuracy as mentioned above, combining effectively the filtration property of a straight-line-like metal fiber and a detailed curve-like metal fiber, and is to offer the sintering mold filter which improved a

filtration efficiency and dependability sharply.

[0006]

[Means for Solving the Problem] The 1st filtration fiber layer which this invention carries out the laminating of the straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, and it comes to sinter, By having provided the 2nd filtration fiber layer by which carried out the laminating of the detailed metal fiber of the shape of a curve formed in the cross-section approximate circle configuration, sintered it by the focusing wire drawing method etc., and multistory was carried out to the 1st filtration fiber layer The prehension effectiveness and the filtration accuracy of a foreign matter by the detailed metal fiber are effectively raised combining the fragmentation function of a straight-line-like metal fiber.

[0007] Moreover, in the above-mentioned sintering mold filter, by having provided the middle filtration fiber layer by which carried out the laminating of the narrow diameter straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, sintered it, and multistory was carried out between the 1st filtration fiber layer and the 2nd filtration fiber layer, said filtration efficiency is raised further and dependability is raised.

[0008]

[Function] The 1st filtration fiber layer laminating which carries out the laminating of the straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, and comes to sinter it There is almost no opening of a filter hole in the bottom of high pressure, and, therefore, a filtered object is effectively cut out to the ridgeline of the fiber. The 2nd filtration fiber layer by which subdivided, carried out the laminating of the detailed metal fiber of the shape of a curve formed in the cross-section approximate circle configuration by the focusing wire drawing method etc., sintered [you made it pass, and] it, and multistory was carried out to the 1st filtration fiber layer said subdivided filtered object is filtered, there is almost no restoration to the opening of the filter hole and the original form after passage, and with the prehension effectiveness of a foreign matter, a filtration accuracy is markedly alike and is raised.

[0009] moreover, multistory is carried out between the 1st filtration fiber layer and the 2nd filtration fiber layer, while the middle filtration fiber layer which carries out the laminating of the narrow diameter straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, and comes to sinter it raises said function of the 1st filtration fiber layer further, said function of the 2nd filtration fiber layer boils markedly, it raises, and the outstanding filtration efficiency and dependability are acquired.

[0010]

[Example] The 1st example of this invention is shown in drawing 1 . One in drawing The straight-line-like metal fiber which was manufactured by cutting or the decision method and was formed in the shape of a cross-section polygon, and 2 The detailed metal fiber of the shape of a curve which was manufactured by the focusing wire drawing method etc. and formed in the cross-section approximate circle configuration, and 10 The 1st filtration fiber layer 10 which the 1st filtration fiber layer and 20 carry out the laminating of the straight-line-like metal fiber 1 formed in the shape of a cross-section polygon with *****, cutting, or a decision method in the 2nd filtration fiber layer, and it comes to sinter, the sintering mold filter possessing the 2nd filtration fiber layer 20 by which carried out the laminating of the detailed metal fiber 2 of the shape of a curve formed in the cross-section approximate circle configuration, sintered it by the focusing wire drawing method etc., and multistory was carried out to said 1st filtration fiber layer 10 -- intermediary ****.

[0011] When it furthermore explains in full detail, to the base material of the 1st filtration fiber layer 10 The straight-line-like metal fiber 1 manufactured by the cutting method, the beating method, etc. is used. This straight-line-like metal fiber 1 the fiber of the shape of a straight line which does not almost have a knee in aspect ratios (fiber length -- the diameter of /fiber) 5-500, and the die-length direction, when the intermediary cage and the thing which it is at the manufacture time and has a knee are mixing It is desirable that a proper sorting means removes or a compulsive means, heat treatments, or those concomitant use of a roller etc. adjust in the shape of a straight line. Moreover, a cross-section

configuration has [scalene triangle / an equilateral triangle two equilateral triangles, or] intermediary **** and acute angle ridgeline 1c of 90 or less degrees on a polygon and a concrete target from the manufacturing method, and it becomes fiber of a major diameter compared with the detailed curve-like metal fiber 2. the filter hole shown in drawing 4 B -- a is formed.

[0012] the detailed metal fiber 2 of the shape of a curve manufactured by the focusing wire drawing method etc. is used for the base material of the 2nd filtration fiber layer 20, a fiber cross section will become curve-like soon at a circle configuration, as for this detailed metal fiber 2, it is desirable for a cross-section configuration to be about 1 law, and for there to be no change in a longitudinal direction, and it is sharply formed in the fiber of the diameter of detailed compared with the straight-line-like metal fiber 1. the filter hole shown in drawing 4 A -- b is formed.

[0013] By filamentation etc., the fiber is considered as a curdy wave which serves as almost uniform fiber distribution, and said detailed metal fiber 2 carries out a laminating to request thickness, in order to make it the base material of the 2nd filtration fiber layer 20. The laminating of the straight-line-like metal fiber 1 which moreover serves as a base material of the 1st filtration fiber layer 10 is carried out. This straight-line-like metal fiber 1 distributes to almost uniform fiber distribution, by a proper disperser etc., the laminating of that configuration fiber is carried out to request thickness, and it carries out multistory to it, pressurization or while it has been non-energized, it inserts all those layers in a sintering furnace, in a non-oxidizing atmosphere, is heated, sinters them, and is manufactured by the sintered filter shown in drawing 1 (B). For example, it sets to said sintered filter and the diameter of fiber of the straight-line-like metal fiber 1 is 50 micrometers. The diameter of fiber of the detailed metal fiber 2 is 10 micrometers. It carried out, the 1st filtration fiber layer 10 and the 2nd filtration fiber layer 20 were formed, and the good filtration efficiency was obtained.

[0014] the base material of the 1st filtration fiber layer 10 -- the intermediary **** straight-line-like metal fiber 1 the fiber of the shape of a straight line which is comparatively alike and does not almost have a knee in the die-length direction for the fiber of a major diameter -- an intermediary cage -- the filter hole of the shape of a straight-line polygon as shown in drawing 4 B -- the push by the foreign matter C which formed a, and the deformation resistance to external force was large, and mixed in the filtered object -- being large, even if the force acts As sufficient rigidity thru/or drag force is shown, and the fiber has ridgeline 1c of an acute angle by the shape of a cross-section polygon and shows it to drawing 2, even if the elasticity particle C mixed in the filtered object, i.e., a foreign matter, invades There is almost no filter opening, and according to the wedge operation by each ridgeline 1c, it is subdivided while a foreign matter C has decision division repeated, and it becomes a fine grain, the 2nd filtration fiber layer 20 is passed, and it is filtered again.

[0015] b is formed, it is comparatively alike and opening deformation is carried out. the base material of the 2nd filtration fiber layer 20 -- the intermediary **** detailed metal fiber 2 is formed minutely -- having -- the curve-like fiber of a cross-section approximate circle configuration -- an intermediary cage and a curvilinear configuration as shown in drawing 4 A -- comparatively -- alike -- a small filter hole -- easy intermediary **** It is subdivided effectively and the foreign matter C which passed the 1st filtration fiber layer 10 serves as a moderate particle size. said filter hole -- it passes through without carrying out the opening of the b according to a rank, and most phenomena restored to the original form after passage are not seen, but a very good filtration accuracy is obtained, and this 2nd filtration fiber layer 20 fully plays a role of a decision layer of a filtration accuracy, and raises the prehension effectiveness of a foreign matter, and a filtration accuracy remarkably.

[0016] The 2nd example of this invention is shown in drawing 3. 1 in drawing a The straight-line-like metal fiber of the same configuration of it having been manufactured by cutting or the decision method, having been formed in the shape of a cross-section polygon, and having been formed in the narrow diameter rather than said straight-line-like metal fiber 1 and 10a Compared with ***** and the 1st example, in a middle filtration fiber layer the sintering mold filter possessing middle filtration fiber layer 10a by which carried out the laminating of the narrow diameter straight-line-like metal fiber 1a formed in the shape of a cross-section polygon, sintered it by cutting or the decision method, and multistory was carried out between the 1st filtration fiber layer 10 and the 2nd filtration fiber layer 20 -- an intermediary

cage -- The diameter of fiber of the straight-line-like metal fiber 1 used as the base material of the 1st filtration fiber layer 10 specifically 80 micrometers, The diameter of fiber of straight-line-like metal fiber 1a used as the base material of middle filtration fiber layer 10a 40 micrometers, While the diameter of fiber of the straight-line-like metal fiber 2 used as the base material of the 2nd filtration fiber layer 20 is carried out as 10 micrometers and the same operation as the 1st example and effectiveness are fundamentally acquired by the function of the 1st filtration fiber layer 10 and the 2nd filtration fiber layer 20 Middle filtration fiber layer 10a raises the function of the 1st filtration fiber layer 10 further, therefore the function of the 2nd filtration fiber layer 20 is raised further again, and the outstanding filtration efficiency and dependability are acquired.

[0017] In addition, according to the purpose of using a filter, a specification, etc., various designs are possible for the class of each fiber, the number of formation of path selection or a layer, sequence, etc.

[0018]

[Effect of the Invention] the configurations with above this invention -- the 1st filtration fiber layer laminating which carries out the laminating of the straight-line-like metal fiber formed in the shape of a cross-section polygon by the intermediary cage, cutting, or the decision method, and comes to sinter it There is almost no opening of a filter hole in the bottom of high pressure, and, therefore, a filtered object is effectively cut out to the ridgeline of the fiber. The 2nd filtration fiber layer by which subdivided, carried out the laminating of the detailed metal fiber of the shape of a curve formed in the cross-section approximate circle configuration by the focusing wire drawing method etc., sintered [you made it pass, and] it, and multistory was carried out to the 1st filtration fiber layer said subdivided filtered object is filtered, there is almost no restoration to the opening of the filter hole and the original form after passage, and with the prehension effectiveness of a foreign matter, a filtration accuracy is markedly alike and is raised.

[0019] moreover, multistory is carried out between the 1st filtration fiber layer and the 2nd filtration fiber layer, while the middle filtration fiber layer which carries out the laminating of the narrow diameter straight-line-like metal fiber formed in the shape of a cross-section polygon by cutting or the decision method, and comes to sinter it raises said function of the 1st filtration fiber layer further, said function of the 2nd filtration fiber layer boils markedly, it raises, and the outstanding filtration efficiency and dependability are acquired.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The sectional view (A) showing the 1st example of this invention, and its whole perspective view (B)

[Drawing 2] The sectional view explaining an operation of the 1st example

[Drawing 3] The sectional view (A) showing the 2nd example, and its whole perspective view (B)

[Drawing 4] They are each sintering mold filter top view (A) of the conventional product made from curve-like fiber, and the product made from straight-line-like fiber, and (B).

[Description of Notations]

1 Straight-Line-like Metal Fiber

1a A narrow diameter straight-line-like metal fiber

2 Detailed Metal Fiber

10 1st Filtration Fiber Layer

10a Middle filtration fiber layer

20 2nd Filtration Fiber Layer

[Translation done.]

【特許請求の範囲】

【請求項1】 切削又は裁断方式等で断面多角形状に形成された直線状金属繊維を積層し焼結してなる第1 汙過繊維層と、集束伸線方式等で断面略円形状に形成された曲線状の微細金属繊維を積層し焼結して前記第1 汙過繊維層に重層された第2 汙過繊維層を具備したことを特徴とする焼結型フィルター。

【請求項2】 請求項1記載の焼結型フィルターにおいて、切削又は裁断方式等で断面多角形状に形成された細径の直線状金属繊維を積層し焼結して前記第1 汙過繊維層と前記第2 汙過繊維層の間に重層された中間汙過繊維層を具備したことを特徴とする焼結型フィルター。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、合成樹脂フィルム、合成繊維等の化学製品の製造工程等に適用され、高温、高圧、高粘度の条件下で高精度の汙過特性を発揮する焼結型フィルターに関するものである。

【0002】

【従来の技術】金属の粉末や繊維を基材として焼結した焼結型フィルターが開発されている。特に、金属繊維を基材として焼結した焼結型フィルターは、繊維径、所定面積内に積層される繊維量、空隙率の調整が容易で、所望の仕様に対応できる利点があり、集束伸線法等で断面略円形状に形成された曲線状の微細金属繊維を積層し焼結して形成された焼結型フィルターが一般的になっているが、この焼結型フィルターは、図4Aに示すように曲線状の微細金属繊維2でフィルタ目孔bを形成して、高圧下の使用では、剛性の不足により容易に変形して目開きが生じ易く、被汙過物が捕捉されないで通過し捕捉率低下の原因となり、また、樹脂等の大きい粒子が細分化されないで、そのまま網目を拡大してすり抜け、通過後に原形に復元する実質的な末汙過になり易いなど、その汙過精度はあまり期待できない。

【0003】また、切削又は裁断方式等で断面多角形状に形成された直線状金属繊維を積層し焼結した焼結型フィルターが開発され提案されており、図4Bに示すように直線状金属繊維1でフィルタ目孔aを形成し、目開きを防止するとともに、その繊維は断面多角形状で鋭角的な稜線を有し、その稜線による被汙過物の裁断機能によつて異物の捕捉効率を高め、汙過精度が向上されているが、この直線状金属繊維は、前記曲線状の微細金属繊維に比べ繊維径が大きくて汙過精度の向上には限界がある。

【0004】

【発明が解決しようとする課題】従来の上記焼結型フィルターは、前記直線状金属繊維を基材とし、あるいは、前記曲線状の微細金属繊維を基材として焼結した構造になっているが、いずれもその汙過精度、信頼性の向上には自ずから限界があり、その改善対策が要望されてい

る。

【0005】本発明は、上記のような実情に鑑み開発されたものであつて、その目的とする処は、前記のように直線状金属繊維と、曲線状の微細金属繊維の汙過特性を効果的に組み合わせて、異物の捕捉効率、汙過精度を高め、汙過性能、信頼性を大幅に向上した焼結型フィルターを提供するにある。

【0006】

【課題を解決するための手段】本発明は、切削又は裁断方式等で断面多角形状に形成された直線状金属繊維を積層し焼結してなる第1 汙過繊維層と、集束伸線方式等で断面略円形状に形成された曲線状の微細金属繊維を積層し焼結して第1 汙過繊維層に重層された第2 汙過繊維層を具備したことにより、直線状金属繊維の細分化機能と組み合わせて、微細金属繊維による異物の捕捉効率と汙過精度を効果的に高めている。

【0007】また、上記焼結型フィルターにおいて、切削又は裁断方式等で断面多角形状に形成された細径の直線状金属繊維を積層し焼結して第1 汙過繊維層と第2 汙過繊維層の間に重層された中間汙過繊維層を具備したことにより、前記汙過性能をさらに高め、信頼性を向上させている。

【0008】

【作用】切削又は裁断方式等で断面多角形状に形成された直線状金属繊維を積層し焼結してなる第1 汙過繊維層積層は、高圧下においてフィルタ目孔の目開きが殆どなく、その繊維の稜線によつて被汙過物を効果的に裁断、細分化して通過せしめ、集束伸線方式等で断面略円形状に形成された曲線状の微細金属繊維を積層し焼結して第1 汙過繊維層に重層された第2 汙過繊維層は、細分化された前記被汙過物を汙過し、そのフィルタ目孔の目開き、通過後の原形への復元が殆どなく、異物の捕捉効率とともに、汙過精度が格段に高められる。

【0009】また、第1 汙過繊維層と第2 汙過繊維層の間に重層されて、切削又は裁断方式等で断面多角形状に形成された細径の直線状金属繊維を積層し焼結してなる中間汙過繊維層は、第1 汙過繊維層の前記機能をさらに高めるとともに、第2 汙過繊維層の前記機能を格段に高め、優れた汙過性能、信頼性が得られる。

【0010】

【実施例】図1に本発明の第1実施例を示し、図中1は、切削又は裁断方式等で製造されて断面多角形状に形成された直線状金属繊維、2は、集束伸線方式等で製造されて断面略円形状に形成された曲線状の微細金属繊維、10は、第1 汙過繊維層、20は、第2 汙過繊維層であつて、切削又は裁断方式等で断面多角形状に形成された直線状金属繊維1を積層し焼結してなる第1 汙過繊維層10と、集束伸線方式等で断面略円形状に形成された曲線状の微細金属繊維2を積層し焼結して前記第1 汙過繊維層10に重層された第2 汙過繊維層20を具備し

3

た焼結型フィルターになつてゐる。

【0011】さらに詳述すると、第1 濾過繊維層10の基材には、切削方式、細断方式等により製造された直線状金属繊維1が使用され、この直線状金属繊維1は、アスペクト比(繊維長さ/繊維径)5~500、長さ方向に殆ど曲りのない直線状の繊維になつており、製造時点で曲りのあるものが混入している場合は、適宜の選別手段で除去するか、ローラー等の強制手段、あるいは熱処理もしくはそれらの併用等により直線状に調整するのが好ましく、また、その製造法から断面形状が多角形、具体的には正三角形、2等辺三角形、あるいは不等辺三角形等になつていて、90度以下の鋭角な稜線1cを有し、曲線状の微細金属繊維2に比べ大径の繊維となる。図4Bに示すフィルタ目孔aが形成される。

【0012】第2 濾過繊維層20の基材には、集束伸線方式等で製造された曲線状の微細金属繊維2が使用され、この微細金属繊維2は、繊維断面が円形状に近く曲線状となり、長手方向に断面形状がほぼ一定で、変化のないのが望ましく、直線状金属繊維1に比べ大幅に微細径の繊維に形成される。図4Aに示すフィルタ目孔bが形成される。

【0013】前記微細金属繊維2は、第2 濾過繊維層20の基材にするために、その繊維を開織等により、ほぼ均一な繊維分布となるような綿状ウェブとし、所望厚さに積層する。その上に、第1 濾過繊維層10の基材となる直線状金属繊維1を積層する。この直線状金属繊維1は、その構成繊維を適宜の分散機等により、ほぼ均一な繊維分布に分散し所望厚さに積層して重層し、その全層を加圧または無加圧のまま焼結炉に装入し、非酸化性雰囲気中で加熱、焼結して、図1(B)に示す焼結フィルターに製造される。例えば、前記焼結フィルターにおいて、直線状金属繊維1の繊維径は50 μ m、微細金属繊維2の繊維径は10 μ mとし、第1 濾過繊維層10及び第2 濾過繊維層20を形成し良好な濾過性能が得られた。

【0014】第1 濾過繊維層10の基材になつてゐる直線状金属繊維1は、比較的に大径の繊維で、長さ方向に殆ど曲りのない直線状の繊維になつており、図4Bに示すような直線多角形状のフィルタ目孔aを形成し、外力に対する変形抵抗が大きく、被濾過物に混入した異物Cによる押し広げ力が作用しても、十分な剛性ないし抵抗力を示し、また、その繊維は断面多角形状で鋭角の稜線1cを有し、図2に示すように被濾過物に混入した軟質粒子、即ち異物Cが侵入しても、フィルタ目開きが殆どなく、各稜線1cによる楔作用により、異物Cが裁断分割を繰り返されながら細分化され、細粒となり第2 濾過繊維層20を通過し再び濾過される。

【0015】第2 濾過繊維層20の基材になつてゐる微細金属繊維2は、微細に形成されて、断面略円形状の曲線状繊維になつており、図4Aに示すような曲線形状で

4

比較的に小さなフィルタ目孔bを形成し、比較的に目開き変形し易くなつてゐるが、第1 濾過繊維層10を通過した異物Cは効果的に細分化されて適度な粒径となり、前記フィルタ目孔bを格別に目開きさせないですり抜け、通過後に原形に復元する現象も殆ど見られず、非常に良好な濾過精度が得られ、この第2 濾過繊維層20は、濾過精度の決定層としての役割を十分に果たし、異物の捕捉効率、濾過精度を著しく高める。

【0016】図3に本発明の第2実施例を示しており、図中1aは、切削又は裁断方式等で製造されて断面多角形状に形成されて、前記直線状金属繊維1よりも細径に形成された同様な構成の直線状金属繊維、10aは、中間濾過繊維層であつて、第1実施例に比べると、切削又は裁断方式等で断面多角形状に形成された細径の直線状金属繊維1aを積層し焼結して第1 濾過繊維層10と第2 濾過繊維層20の間に重層された中間濾過繊維層10aを具備した焼結型フィルターになつており、具体的には、例えば、第1 濾過繊維層10の基材となる直線状金属繊維1の繊維径は80 μ m、中間濾過繊維層10aの基材となる直線状金属繊維1aの繊維径は40 μ m、第2 濾過繊維層20の基材となる直線状金属繊維2の繊維径は10 μ mとして実施され、第1 濾過繊維層10と第2 濾過繊維層20の機能により基本的に第1実施例と同様な作用、効果が得られるとともに、中間濾過繊維層10aは、第1 濾過繊維層10の機能をさらに高め、従つてまた、第2 濾過繊維層20の機能がさらに高められ、優れた濾過性能、信頼性が得られる。

【0017】なお、各繊維の種類、径選択や層の形成数、順序等は、フィルターの使用目的、仕様等に応じて多様な設計が可能である。

【0018】

【発明の効果】本発明は、上述のような構成になつており、切削又は裁断方式等で断面多角形状に形成された直線状金属繊維を積層し焼結してなる第1 濾過繊維層積層は、高圧下においてフィルタ目孔の目開きが殆どなく、その繊維の稜線によつて被濾過物を効果的に裁断、細分化して通過せしめ、集束伸線方式等で断面略円形状に形成された曲線状の微細金属繊維を積層し焼結して第1 濾過繊維層に重層された第2 濾過繊維層は、細分化された前記被濾過物を濾過し、そのフィルタ目孔の目開き、通過後の原形への復元が殆どなく、異物の捕捉効率とともに、濾過精度が格段に高められている。

【0019】また、第1 濾過繊維層と第2 濾過繊維層の間に重層されて、切削又は裁断方式等で断面多角形状に形成された細径の直線状金属繊維を積層し焼結してなる中間濾過繊維層は、第1 濾過繊維層の前記機能をさらに高めるとともに、第2 濾過繊維層の前記機能を格段に高め、優れた濾過性能、信頼性が得られる。

【図面の簡単な説明】

【図1】本発明の第1実施例を示す断面図(A)とその

5

6

全体斜視図(B)

【図2】第1実施例の作用を説明する断面図

【図3】第2実施例を示す断面図(A)とその全体斜視図(B)

【図4】従来の曲線状繊維製と直線状繊維製の各焼結型
フィルター平面図(A)、(B)である。

【符号の説明】

1

1a

2

10

10a

20

直線状金属繊維

細径の直線状金属繊維

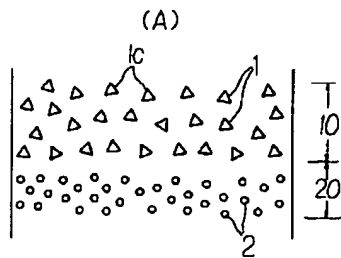
微細金属繊維

第1 汙過繊維層

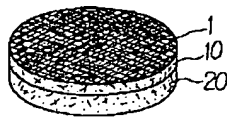
中間汙過繊維層

第2 汙過繊維層

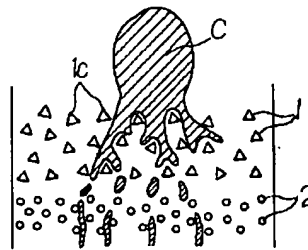
【図1】



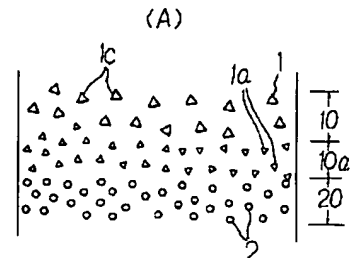
(B)



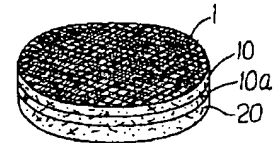
【図2】



【図3】

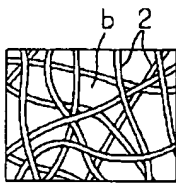


(B)



【図4】

(A)



(B)

